TUWH1000® Series

Low power UHF Transmitters

High Efficiency Wideband to cope any broadcast network topology

WHET® Wideband High Efficiency Transmitters

Reliability and efficiency

Simple installations for confined spaces

Egatel

TUWH1000® Series

Ultra-compact UHF TV Transmitters

Flexibility and Efficiency in low power

The new ultra-compact (1U) TUWH1000 Series of TV Transmitters expands the capabilities of Wideband High Efficiency Egatel Transmitters covering any requirement and broadcast network topology and providing an ideal solution for extending digital TV networks.

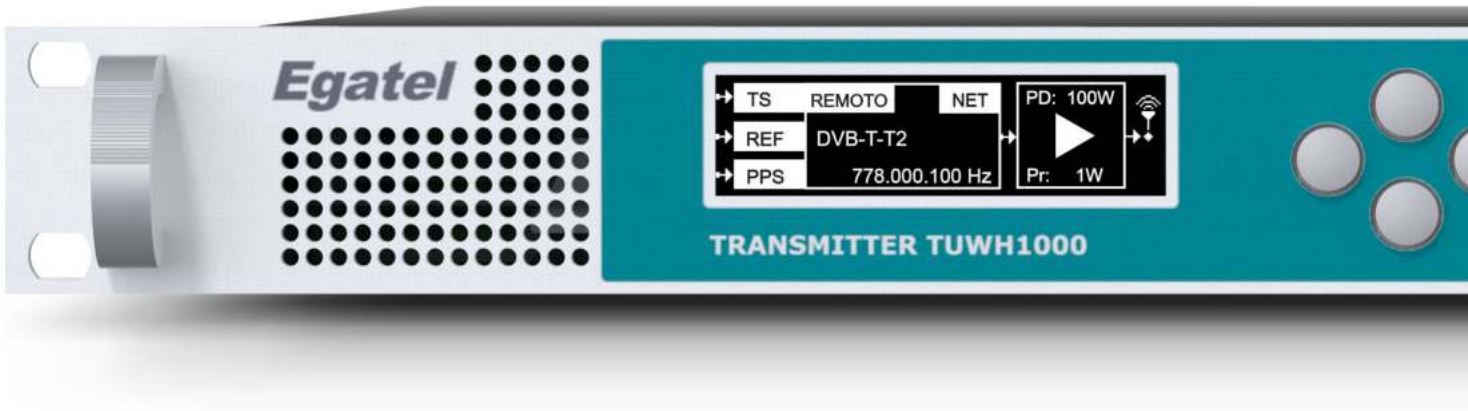
It features a top-class Digital Adaptive Precorrection system to automatically cancel the amplifier distorsion and a powerful WEB GUI to provide an easy and friendly way for local and remote control, making easier monitoring and maintenance tasks.

Table of models

TUWH1000 (**)	TUWH1050 (*)	TUWH1200 (*)	TUWH1101
Power (before the filter) COFDM	5 Wrms	25 Wrms	120 Wrms
Power (before the filter) ATSC	5 Wrms	25 Wrms	125 Wrms

(**) The models are referenced according to standard:
TUWH10x0 - DVB-T/H/T2, TUWH10x0B - ISDB-T/TB, TUWH10x0A - ATSC
Example: TUWH1101B - 120 Wrms ISDB-T/TB. Other configurations of output power and number of amplifiers, on request.

(*) No Doherty.



Benefits and key features

1. Leading efficiency wideband TV transmitters

- Doherty Technology
- Wideband advantages

2. Full versatility, adaptable to any broadcast network

- Compact design
- Advanced integrated features
- Adaptive Digital Precorrection
- Crest factor reduction
- TSoIP inputs
- QoS analyzer integrated

3. Quick start-up and easy operation

- Intuitive operation
- Instantaneous configuration via SD card

4. High reliability

- Redundant configurations
- Optimum cooling system design

5. Service and support

- Rigor and professionalism

Wideband Doherty Technology.

Leading efficiency

WHET® Wideband High Efficiency Transmitters

Doherty Technology

Transmitter's energy efficiency is a key factor for network operators by the time of selecting TV transmitters.The main reason is the energy cost, since after ten years of operation it can represent up to three times the initial investment.

The adoption of Doherty Technology in TV transmitters makes possible to boost energy efficiency values up to 42%, representing an improvement of almost 50% over traditional technology transmitters.

Despite all its advantages, classical Doherty topology has an inconvenient: It is an inherently narrowband technology. It involves that so far, the power amplifiers had to be precisely adjusted to work optimally in their RF channel. Therefore, when a channel change was requested, the network operator had to modify the power amplifiers or replace them with new ones. Obviously, this also greatly complicates the maintenance tasks, management and logistics of spare units.

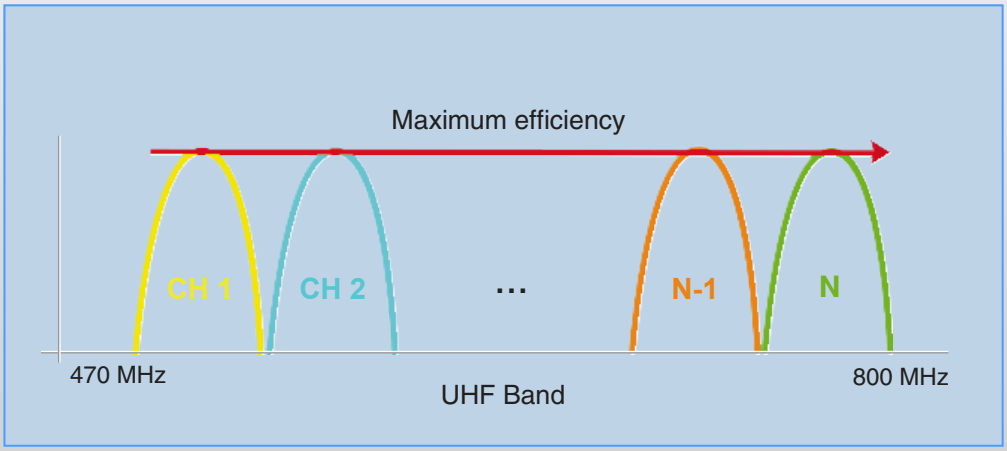
Wideband advantages

The TUWH1000 Series, equipped with wideband Doherty technology, overcomes the drawbacks of classical Doherty transmitters while keeping all the benefits. Thus definitively ends with trade-offs. You don't need to waste frequency agility to optimize energy efficiency.

Although it is a low power series, the energy efficiency has a big impact in expenses due to the large number of transmitters needed in low power networks.

Efficiency optimization throughout the UHF band

TUWH1000 Series transmitters as part of N +1 system, main and reserve, are identical. The associated cost with equipment replacement is reduced and simplified.

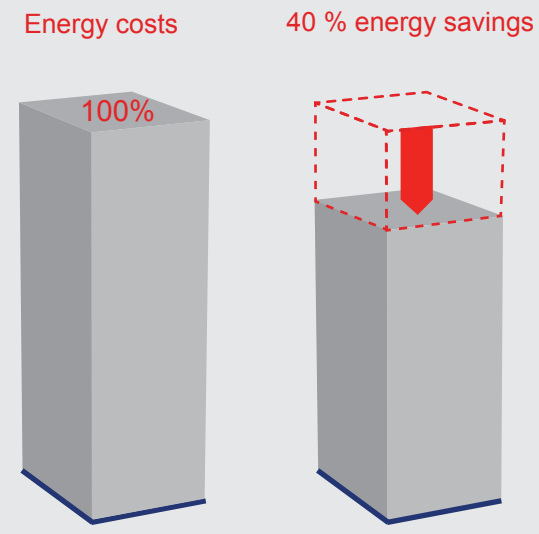


This series achieves energy efficiency up to 38% for COFDM and 42% for ATSC waveforms. The efficiency is maintained throughout the UHF range, so no adjustment is required in the power amplifiers at the time of changing the RF channel of operation. Moreover, with the wideband technology there is only one reference for the power amplifiers, which drastically simplifies the management of spare parts.

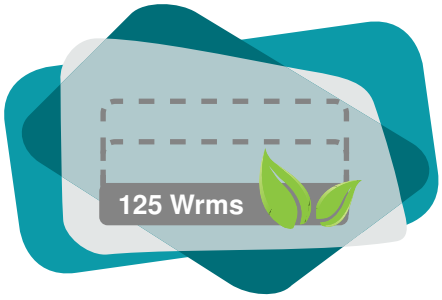
An example that illustrates the benefits of wideband Doherty amplifiers is the N+1 configuration. With classic Doherty technology, each main transmitter must be perfectly adjusted to its transmission channel in order to get the maximum efficiency. On the other hand, the reserve transmitter must be able to replace any of the main transmitters.

Therefore, it cannot work in Doherty mode and its energy efficiency is lower. As a consequence, the design of the power supply network of the entire system becomes more complex. Moreover, it is necessary to handle different types of power amplifiers, depending on they are for main or reserve transmitters.

WHET Series energy savings



Equipped with Wideband Doherty Technology, all TUWH1000 transmitters comprising an N +1 system are identical, main and reserve, the power consumption of the whole system is optimal and homogeneous. Furthermore, working with just a unique reference leads to reduction in maintenance and logistics cost.



Superior space-saving
GREATER EFFICIENCY

4+1 rack configuration.
5 x TUWH1101 Transmitter+ CCU9000 Control Unit

Versatile & adaptable

All features of WHET series in only 1U high

WHET® Wideband High Efficiency Transmitters

Compact design

Designed for filling in coverage gaps in challenging and space saving situations, the TUWH1000 series provides a high degree of versatility and flexibility. Customers can choose from a multitude of different configurations to get the one that best suits their needs.

The use of LDMOS-50 volts transistors technology, the optimum design of Wideband Doherty amplifier stage and the matching networks, allows reaching an outstanding power density, up to 125 Wrms in only 1U.

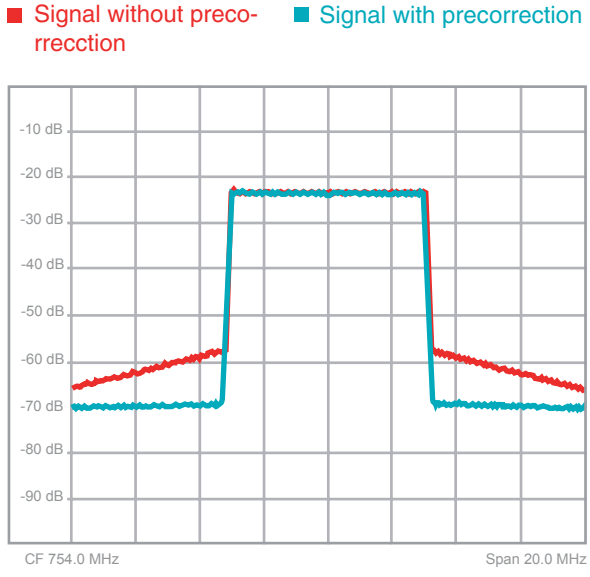
The high level of integration considerably relaxes the space requirements for installation. This is a key factor in those locations suffering a lack of space. Considering the cost per square meter, saving space also means saving money.

Advanced integrated features

The Transmitters are ready to work with the main international TV standards: DVB-T/H, DVB-T2, ISDB-T/T_B, ATSC MH/SFN. Up to two standards can be simultaneously stored in a single transmitter, offering network operators planning to combine or migrate, for example from DVB-T to DVB-T2, a high flexibility level. They are equipped with advanced features to accelerate the start up, ease the operation and monitoring as well as to optimize the transmitted signal.

Applying state-of-the-art technology, TUWH1000 series has implemented Direct RF generation which helps to optimize the broadcast signal quality.

Output signal optimization
Integrated QoS analyzer: MER, BER, PER...



4K UHDTV transmission via DVB-T2 Ready

Adaptive Digital Precorrection

The adaptive digital precorrection system enables the equalization of the signal easily and quickly. It can be activated manually, by a programmed trigger or it can run continuously and adaptively. The processing power of the precorrector allows to achieve unbeatable Shoulders and MER values, ensuring the highest quality in the transmitted signal and improving energy efficiency.

Crest factor reduction

It offers for all OFDM standards the advantage of crest factor reduction implemented by a proprietary technology, that allows without any negative impact on MER, to reduce the signal crest factor enhancing the transmitter efficiency.

TSoIP inputs

The transmitter has an integrated Transport Stream over IP receiver able to manage two ASI streams over a Gigabit Ethernet bus. The switching between the two inputs is fully automatic and Seamless. Thus, operators get both economic and space savings avoiding the installation of an external receiver.

Integrated QoS analyzer (DVB-T, DVB-T2, ISDB-Tb)

The TUWH1000 integrates a HW demodulator to provide with Shoulders, MER, BER and PER values. This feature allows to evaluate the quality of the signal in real time and to access this information remotely through the Web server or an SNMP client. Therefore, it saves unnecessary trips to unattended sites and the use of an external analyzer to check the output signal of the transmitter.

Standards especifications

DVB-T/-H/-T2	
Standard	EN300744, EN302304, EN302755, TS 102831, TS 102 773 (T2-MI)
Inputs	2xASI BNC (H), 75 ohm / 2xTSoIP 10/100/1000 RJ45.
FFT Size	1K (DVB-T2), 2K, 4K, 8K, 16K (DVB-T2), 32K (DVB-T2)
Code rate	1/2, 2/3, 3/4, 5/6, 3/5 (DVB-T2), 4/5 (DVB-T2)
Guard interval	1/32, 1/16, 1/8, 1/4, 19/256 (DVB-T2), 19/128 (DVB-T2), 1/128 (DVB-T2)
Constelation	QPSK, 16QAM, 64QAM, 256QAM (DVB-T2). Rotated and no rotated (DVB-T2)
ATSC	
Standard	ATSC A/53, A/54, A/64, A/153, A/110B, SMPTE-310M
Inputs	2xSMPTE BNC (H), 75 ohm - 2xASI BNC (F), 75 ohm
Constelation	8VSB
Symbol rate	10.76 Msímbolos/s
Data rate	19.39 Mbits/s
Trellis coding	2/3
Reed-Solomon encoder	207 / 187 / 10
ISDB -T/-Tb	
Standard	ARIB STB-B31, TR-B14
inputs	2xASI BNC (F), 75 ohm
FFT Size	2K, 4K, 8K
Code rate	1/2, 2/3, 3/4, 5/6, 7/8
Guard interval	1/4, 1/8, 1/16, 1/32
Carrier spacing	4 KHz, 2 KHz, 1 KHz
Hierarchical modulation	Up to 3 layers
Constelation	QPSK, 16QAM, 64QAM, DQPSK

Quick start up and easy operation

All the blocks that make up the transmitter chain are shown in the upper half. A simple color coding is used to check instantly the status of individual blocks; to read or modify any parameter, just click and drag the corresponding block to drop it in the bottom of the screen, where the parameters of up to three different blocks can be displayed. The GUI has been designed to never lose sight of the transmitter status.

Intuitive operation

The TUWH1000 series offers network operators all the convenience during the start up, operation and maintenance of the transmitter.

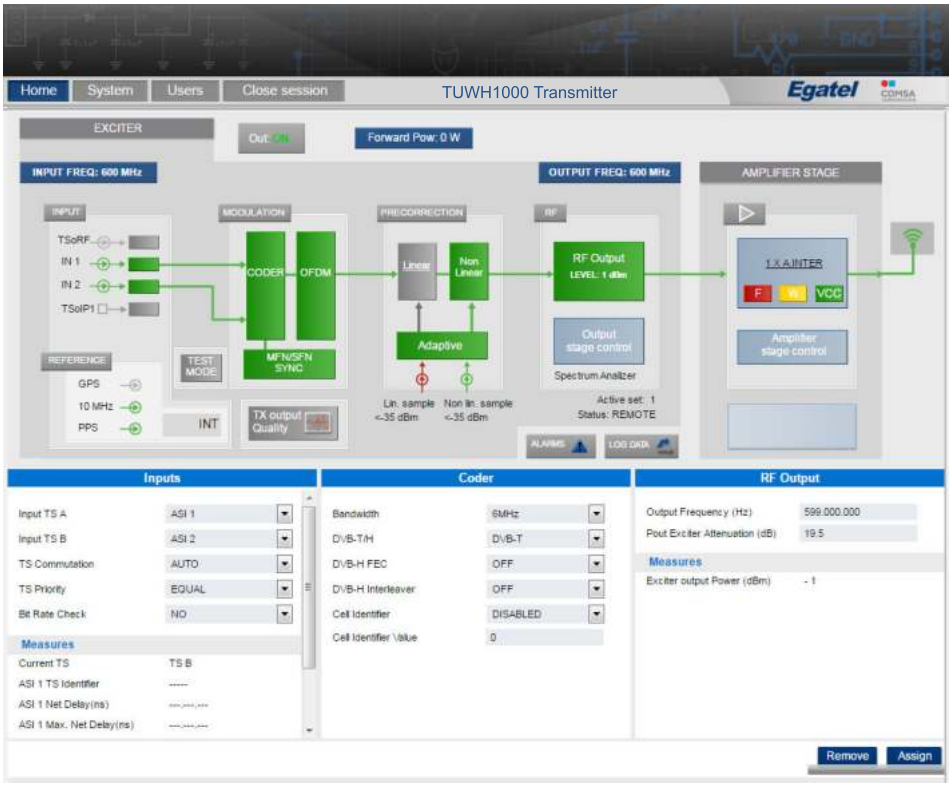
Through an integrated display in the front panel, users can easily access to the whole configuration of the transmitter without any other need.

It also integrates the most powerful and friendly Web Server on the market. The Graphical User Interface (GUI) divides the screen into two parts.

Instantaneous configuration via SD card

The new series includes an SD card to store the whole configuration of the transmitter, so the start up of a new transmitter or the configuration of a spare unit is done in seconds, this is also particularly useful to put in operation N+1 systems quickly.

Transmitter Web GUI



Login window

High reliability

Redundant configurations

The transmitters together with a CCU9000 Control Unit can be configured to set up N+1 systems. The extremely compact design concept allows to integrate N +1 systems in only one rack.

The Control Unit is equipped with a high resolution graphical display through which is easy to locally set or change any parameter and to perform an assessment of the transmission chain at a glance. Similarly, the control unit provides remote access to the transmitters through a powerful Web GUI or via the SNMP protocol.

Optimum cooling system design

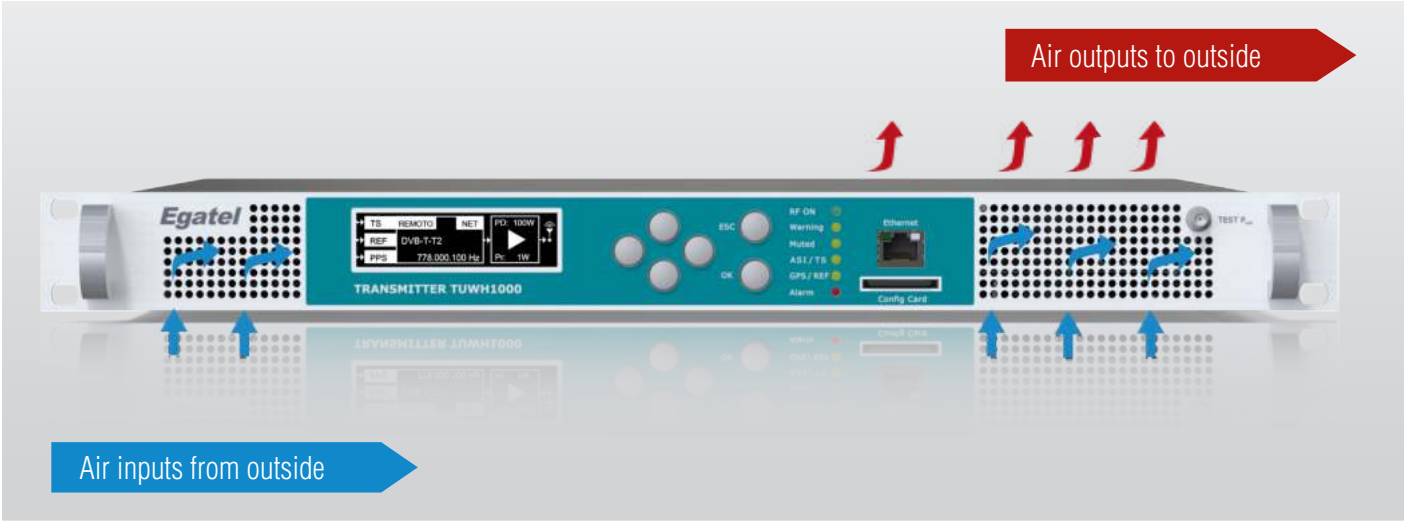
The TUWH100 series monitors and manages its own cooling system and holds its remote management.

Each transmitter has three fans that allow a correct operation without and external air conducting unit. Furthermore, the fans can be easily and quickly hot-swapped from the back making it easy maintenance tasks.

The built-in fans automatically run at a variable speed according to the cooling requirements at any time, contributing to increase the energy efficiency and the transmitter lifetime.

Cooling system

TUWH1000 - back view



Service and support

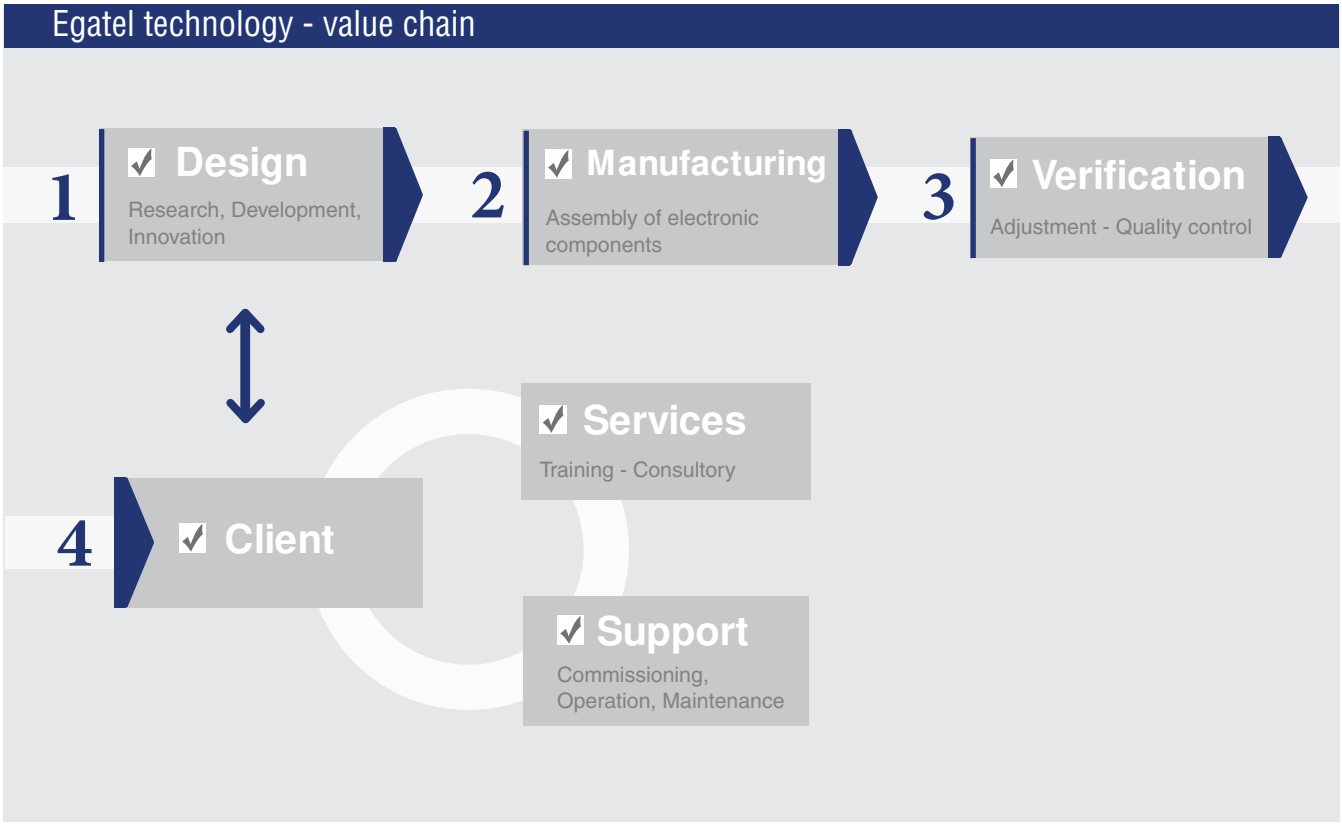
Rigor and professionalism

All processes that add value from the design stage to the manufacturing of the transmitters are carried out in-house. The company owns dedicated facilities for the mount of electronic components with several production lines equipped with the most advanced machines on the market. Therefore, the quality control throughout the production process is kept at Egatel, reaching the maximum reliability.

The international recognition achieved by the company is due not only to the supply of high technology products, but also to the wide range of services offered. They go a step beyond, with dedicated staff to provide full assistance during commissioning and normal operation or to offer qualified training, adding value and completing the process that begins when a customer trust in Egatel.

Each project is undertaken with the maximum level of commitment, accomplishing the delivery times and adapting to the demands of each customer, being aware of the importance of a professional attitude in their loyalty.

Egatel is integrated in Comsa Corporación, which is one of the biggest industrial groups in Spain within the sectors of infrastructure and technology. The group has a strong activity all around the five continents and it is established in 18 countries. The customers benefit from this wide international presence and the stability provided by a multinational company, guaranteeing local support and the purchase of Egatel equipment as a safe investment.



Technical especifications

Transmitter

Clock and synchronization			
Internal clock	40 MHz		
External 10 MHz reference	BNC (F). Impedance = 50 ohm / high (selectable). Level = -5 a +10 dBm		
External 1pps reference	BNC (F). Impedance = 50 ohm / high (selecctable)		
SFN	SFN resolution : ±100 ns. SFN configurable delay: ±500 ms		
Digital Adaptive Precorrection (*)			
Non-Linear	Amplitude: ±6 dB / Phase: 60º		
Linear	Amplitude: ±3 dB / Delay: ±500 ns		
Clipping	12 dB		
Operation mode	Continuous / Automatic (triggering: time/shoulder level)		
Monitoring:			
- Shoulder level	Measurement of left and right shoulder level		
- Precorrection status	Running / Stopped		
RF Output			
Frequency range	470 ... 800 MHz		
Bandwidth	6, 7, 8 MHz más 1.7, 5 y 10 MHz para DVB-T2		
Resolution	1 Hz		
Outpur power (before the filter)	TUWH1050 (**)	TUWH1200 (**)	TUWH1101
- DVB-T/-H/-T2, ISDB -T/-T_B	5 Wrms	25 Wrms	120 Wrms
- ATSC	5 Wrms	25 Wrms	125 Wrms
Connector	N (F) 50 ohm		
Local and remote control			
LCD Display	Local operation through LCD display and keyboard located on the front panel		
Front RJ-45	Local operation through a Web Server Graphical User Interface		
Rear RJ-45	Remote Network management interface (Web Server and/or SNMP)		
Parallel interface	Floating contacts for messages and commands		

General

Dimensions (WxHxD mm)	483 (19") x 44,4 (1U) x 444 mm
Cooling	Forced air
Relative humidity	95% max. (non-condensing)
Operation temperature range	+1...45ºC
Power supply	Single - phase: 100VAC ... 240VAC, 47... 63Hz / 48Vdc
Max. installation altitude	2500 m (> 2500 m on request)

(*) Static linear and non-linear precorrection is included as default. Digital Adaptive Precorrection is optional but can be activated at any time through a software key.

Remark: To comply with the out-of-band regulations and with the required shoulder attenuation, the RF output of the transmitters must be connected to an appropriate filter.

EGATEL.SL

Web: www.egatel.es
e-mail: egatel@egatel.es

HEADQUARTERS

Egatel Building
Av. Ourense, 1
Parque Tecnolóxico de Galicia
32901 Ourense
Phone: +34 988 368 118
Fax: +34 988 368 119

INTERNATIONAL SALES

C/ Julián Camarillo, 6A - 2ª
28037 Madrid
Phone: +34 988 368 118
Fax: +34 988 368 119

EGATEL MEXICO

Av. Insurgentes Sur 664, 9th floor
Col. del Valle,
Mexico D.F. 03100
Phone: +52 (1) 55 4880 9238
e-mail: ssanz@egatel.es

EGATEL CHILE

Avda. Presidente Riesco, 5335
9th floor - 7561127 Las Condes
Santiago de Chile
Phone: +54 9 11 5937 4848
e-mail: crusso@egatel.es

EGATEL ARGENTINA

Av. Santa Fé 1845
4th floor Of. B
1123 Buenos Aires, C.F.
Phone: +54 9 11 5937 4848
e-mail: crusso@egatel.es

AENOR Gestión Ambiental GA-2006/0073 · AENOR Empresa Registrada ER-0120/2002 · CERTIFIED IQNet MANAGEMENT SYSTEM

Egatel